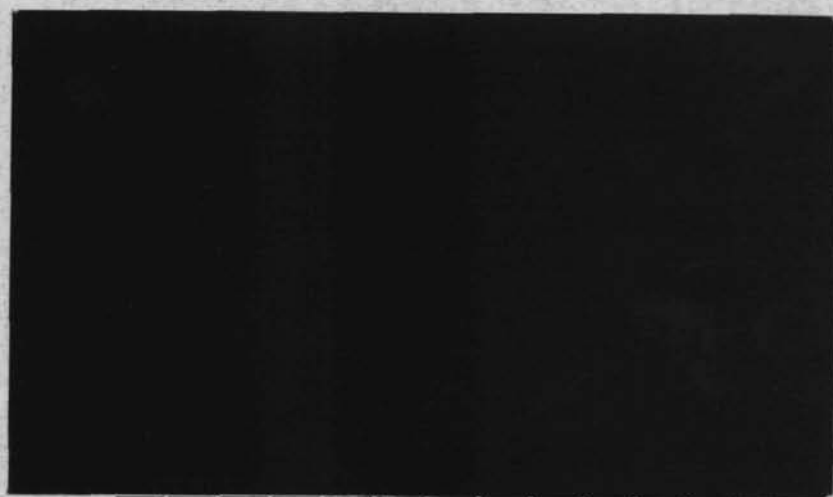




**C**entre for  
**A**boriginal  
**E**conomic  
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**R**esearch

Discussion Paper



**Estimating Aboriginal and Torres Strait  
Islander fertility from census data**

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## SERIES NOTE

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- to investigate issues relating to Aboriginal employment and unemployment;
- to identify and analyse the factors affecting Aboriginal participation in the labour force; and
- to assist in the development of government strategies aimed at raising the level of Aboriginal participation in the labour force and at the stimulation of Aboriginal economic development.

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Jon Altman  
Director, CAEPR  
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## **ABSTRACT**

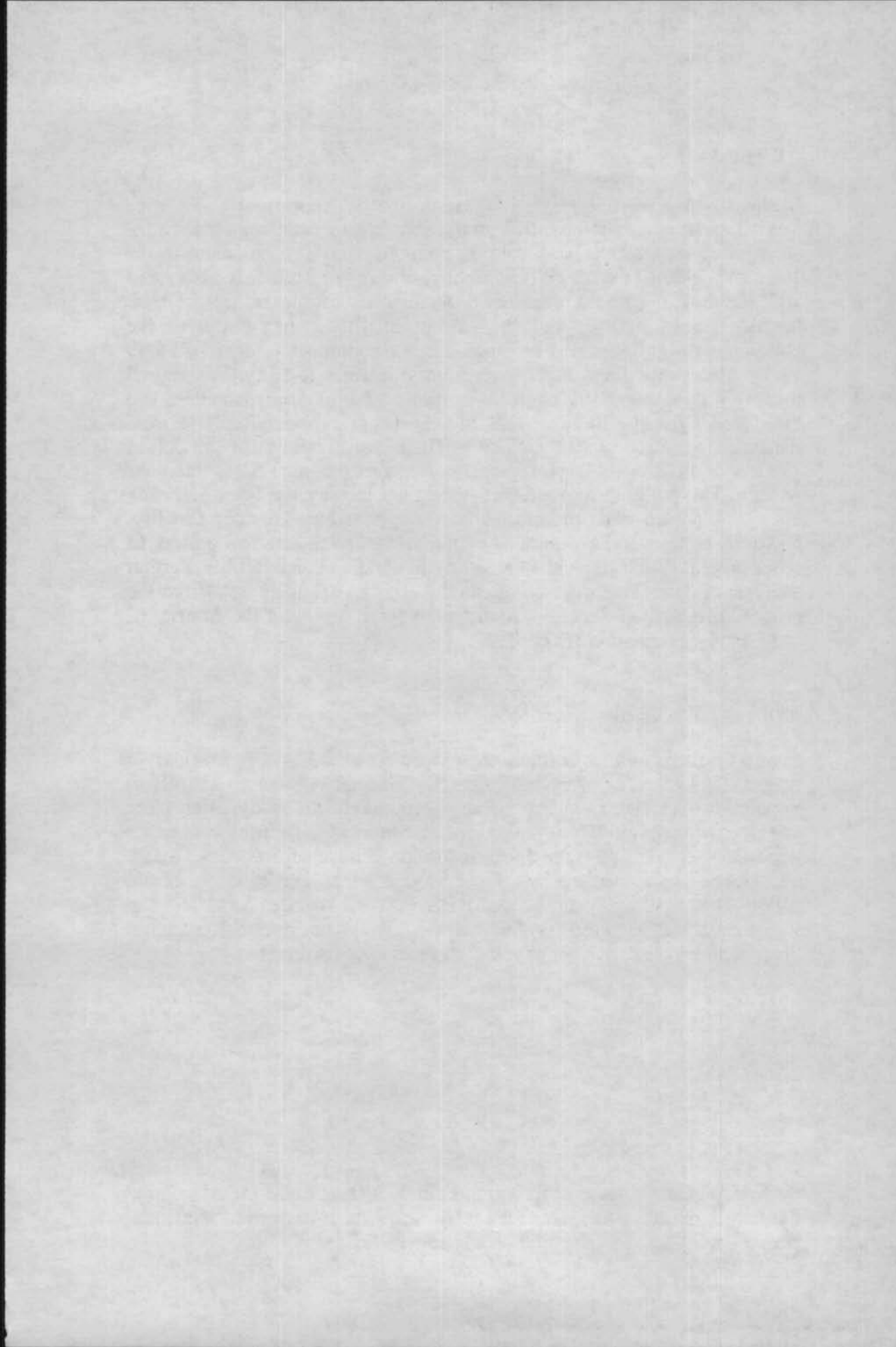
In the absence of routine vital statistics for the Aboriginal and Torres Strait Islander populations, this study attempts to estimate fertility for each group separately, using data on children ever-born collected in the 1981 and 1986 Censuses. While highlighting major problems associated with the data, two basic measures of fertility are estimated: (a) life-time fertility (mean parity); and (b) current fertility consistent with the children ever-born reported by women in the reproductive ages of 15-49 years. The study finds that in terms of life-time fertility, Aboriginal fertility was substantially higher than that of Torres Strait Islanders and both these groups, in turn, had higher mean parities than the total Australian population. The estimated Total Fertility Rate for the period 1981 and 1986 was 3.1 for Aboriginal women and 3.3 for Islander women. This study also found that Aboriginal fertility has been declining over that period and further declines are possible. Islander fertility, however, appears to have resisted a similar decline during that period. In order to gain further insight into Aboriginal and Islander fertility, further analysis of data using different methodologies and fertility data from the proposed Australian Bureau of Statistics national survey of the Aboriginal and Islander population are needed.

## **Acknowledgements**

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In 1989, the Federal Government established the Aboriginal and Torres Strait Islander Commission (ATSIC) with 60 regional councils, each responsible for formulating regional plans for the socioeconomic and cultural development of Aborigines and Torres Strait Islanders (hereafter stated as Islanders). This legislation has created a demand for population data at the regional level. As part of this general demand, the need for separate statistics for Aborigines and Islanders has also been growing (Altman 1992; Arthur 1992). Apart from these political and planning needs, the coverage and accuracy of population census counts appear to be different for these two population groups. This is particularly reflected in the 1991 Census preliminary results (Gaminiratne 1992). This also strengthens the case for separate data analysis for Aborigines and Islanders.

For effective policy planning, accurate assessment of the future size and composition of the sub-populations is needed. The present size and composition of the Aboriginal and Islander populations is primarily determined by patterns of mortality and fertility. Current population age structure, fertility and mortality patterns will, in turn, shape future population size and composition. To predict the future, therefore, one needs to study past trends and present levels in fertility and mortality. The available data on Aboriginal and Islander mortality show rapid improvements in the survival chances, particularly among infants, children and women (Gray 1988). Life expectancy during the 1981-86 intercensal period has been estimated at 64 years for women and 56 years for men (Gray 1990a: 155). With rapidly improving chances of survival of the population, mortality will become a less important influence on the future size and composition of the population and fertility will become the predominant factor. This paper attempts to explore the levels, trends and differentials in fertility between Aboriginal and Islander populations separately. It is the first part of ongoing research to assess differences in the socioeconomic and demographic characteristics of the two groups.

### **Aboriginal and Islander fertility: data sources**

Fertility estimates by the conventional method, relating births in a given year to person-years of exposure, is not possible for Aborigines and Islanders because of a lack of accurate data. The registration of vital events in Australia is maintained by States and Territories under their own legislation. After decades of considerable negotiation, particularly by an inter-ministerial committee on health statistics (Task Force 1985), all States and Territories, except Queensland, agreed to identify Aboriginal and Islander births on registration forms. Provision is now made on registration forms to identify Aboriginal or Islander births and deaths in all States and Territories, except Queensland (Gaminiratne and

Tesfaghiorghis 1992). Coverage of births and deaths, however, is not yet complete, and the Australian Bureau of Statistics (ABS) releases basic data only for the Northern Territory, Western Australia and South Australia where the coverage of Aboriginal and Islander births and deaths is considered to be reasonably complete. But even in States where Aboriginal and Islander identifiers have been included on registration forms, Aboriginal and Islander births cannot be separately identified, except in the Australian Capital Territory and Tasmania.

The only source of comprehensive Aboriginal demographic and socioeconomic data is the national population census conducted every five years. The very basic fertility measure that a census provides is the child-woman ratio, which is derived by relating children in the 0-4 year age group to the total number of women in the reproductive ages (15-49 years or 15-44 years). This measure is not a good fertility indicator as it is largely affected by the age-sex structure of the population. Nor does it take into account the mortality pattern of the population, as only the children and women who were living at the time of the census are used to derive the estimate. Apart from this crude measure of fertility, the data on children ever-born available from censuses carried out from 1966 to 1986 can be used to estimate Aboriginal and Islander fertility. Although these censuses collected data on children ever-born, they are not strictly comparable as they differ in scope.

The 1966 Census required all men and women currently married to report the number of children born in the existing marriage. The next two censuses of 1971 and 1976 restricted the question to females but extended the question's scope to cover all ever-married women. These women were asked to report the number of children they had ever had in all of their marriages. In the 1981 Census, data on children ever-born were collected from all women over the age of 15 years, irrespective of their current marital status. The same approach was adopted in the 1986 Census. The question on the number of children ever-born was dropped from the 1991 Census schedule.

Given the above, it is possible to identify a census data series which gives comparable data for the estimation of fertility. First, censuses from 1976 to 1986 provide comparable data to assess the fertility trends among the ever-married women and currently married women. Second, data from the 1981 and 1986 Censuses provide a comparable data series to assess the fertility of all women. The analysis of fertility data by marital status categories is not attempted here mainly due to data problems. One difficulty in assessing Aboriginal and Islander fertility according to the marital status of women stems from the lack of clarity and the uniformity of census data. For the 1981 and 1986 Censuses marital status of a person was determined on the basis of the response to the following question:

what is each person's present marital status? Five precoded categories were provided for responses to be recorded: never-married, married, separated but not divorced, divorced, and widowed. Married, for census purposes, is legal marriage, and de facto unions need to be recorded as never married, although they may be stable. These procedures, however, are not explained on the census forms. In a special form used in Aboriginal and Islander communities in remote areas, tribal marriages are recognised as legal and recorded as such. Owing to the lack of clarity on the census form there is a strong possibility that in non-remote areas the responses could be misclassified.

The other problem is associated with the intercensal increase of the Aboriginal and Islander populations: between 1981 and 1986 ever-married Aboriginal women aged 15-49 years increased by 6,363, while ever-married Islander women rose by 714. Part of the increase in ever-married women results from changing attitudes towards self-identification and coverage improvements. The rest is due to changes in marital status during the intercensal period. Both these factors affect fertility estimates in the intercensal period, but their relative effects on fertility cannot be easily separated.

### **The data and method of analysis**

The major problem in using census data on the Aboriginal and Islander populations is inconsistency of results, a characteristic that has been reviewed and commented on extensively (Broom and Jones 1973; National Population Inquiry 1975; Choi and Gray 1985; Gray 1983; ABS 1989a; Altman and Gaminiratne 1992; Gaminiratne 1992). The inconsistency of data results primarily from the incomplete coverage of past censuses, changes in census procedures in editing and processing of data (Choi and Gray 1985) and changes in attitudes towards self-identification (ABS 1989a), or what is sometimes termed ethnic migration (Smith 1980). While there has been no rigorous research about change in identification, it is generally assumed that this change has been positive in recent years, that is, more and more Aborigines and Islanders are identifying as indigenous Australians.

Between 1981 and 1986 Aboriginal and Islander populations increased rapidly; the number of women identified as of Aboriginal origin increased from 80,175 to 104,061, an increase of 44 per cent; for Islander women there was an increase of 42 per cent, from 7,690 to 10,929 during the same period. The number of women in the reproductive age group (15-49 years) rose by 58 per cent for Aboriginal women, while the increase was 47 per cent for Islander women. In 1981, the ABS achieved coverage improvements in remote regions, but there was possible



undercoverage in New South Wales, Victoria, South Australia and Tasmania (Gray 1983). The apparent underenumeration was a particular problem in major urban areas. Throughout this analysis it has been assumed that even though the population totals are inconsistent, they will not seriously affect the mean values computed based on the reported children ever-born data for the two population groups. In order to avoid the problem of inconsistency of population counts between the censuses, resulting from differential enumeration in geographic areas, Gray (1983) examined fertility among Aboriginal women according to the geographic criteria, major urban, other urban and rural, because inconsistencies varied between geographic areas. This has not been attempted here for two main reasons: first, since Torres Strait Islanders are a small minority, disaggregation of data by geographic areas will yield insufficient numbers in some cells for a meaningful analysis; and second, the high cost of generating detailed statistics at regional level. Inability to examine fertility levels by such geographic areas might affect the degree of fertility change between 1981 and 1986, as the fertility estimates derived from the 1981 Census tend to be higher than the 'true' level due to the fact that fertility among Aboriginal and Islander women in urban areas is understated.

Children ever-born data collected by a population census (or a household survey) are often subject to reporting errors. Errors due to underreporting of births caused by memory lapses are the most common. Underreporting due to memory lapses normally increase with the age of the mother. Also, it has often been found that women tend not to report children who have died in infancy (United Nations 1983). Children ever-born data only refer to the women who have survived up to census night and the reproductive experience of those women for whom pregnancy and child-birth present a high health risk, have died before census night and are not represented in the data. Such women are also more likely to record high parities (Gray 1983).

Apart from these general problems, there are other issues relating to the data. One such issue is the large proportion of women not reporting any parity. For instance, in the 1981 Census, about one-fifth of Aboriginal women, and about a quarter of Islander women aged 15-49, did not report their parity. These proportions were 15 per cent and 25 per cent, respectively, for the 1986 Census. Experience of many societies shows that some of those not stating parity are women without children, and to estimate the mean number of children ever-born the denominator needs to be adjusted to take into account such women. A methodology to recover such zero parity women from the non-stated category has been developed by El-Badry (1961). Although several modifications to this correction procedure are available, the El-Badry method has been used in this

**Table 1. Percentage of Aboriginal and Islander women in each age group not reporting their parity (number of children ever-born), 1981 and 1986.**

Age group	Aborigines		Islanders	
	1981	1986	1981	1986
15-24	29.8	20.3	36.8	23.7
25-34	10.9	10.1	15.7	11.5
35-49	11.4	12.0	18.9	12.0
15-49	19.5	15.0	25.1	16.7
Number of women	34,595	54,488	3,819	5,605

analysis to correct for the zero-error tendency of women without children not stating their parity as zero.<sup>1</sup>

The other data problem encountered in using ABS data is the unavailability of information on total children ever-born by a woman's age. ABS standard tables include the distribution of women according to age group and stated parity. For practical reasons, the data are truncated at parity 8. The ABS standard tables do not give the data on total children ever-born to women in each age group. In the absence of total children ever-born, one needs to estimate them. For the purpose of estimation of the total number of children ever-born two approaches were used. The first assumed all women in the truncated parity to be parity 9. The second was to estimate the parity distribution of women parity 8+ using parity progression ratios immediate to the truncated parity (depending on the numbers). Finally, the average of the two estimates was used as the estimated number of children ever-born.

In the estimation of fertility rates, quality of reported age data is a factor that should be taken into account. Since the 1976 Census, in instances where the age of an individual is not given in the census schedules, ABS estimates the age on the basis of the answers to other characteristics in the census schedule, or by using a random table constructed on the basis of past census data. The information on such imputations is not available, and unless these are known, evaluation of age data is of little use.

From the data on children ever-born, two basic fertility measures are used to estimate fertility: retrospective (lifetime) fertility rates and current or period fertility. Retrospective fertility is the mean number of children ever-born (mean parity) per woman in the reproductive ages 15-49 years. This measure, being a summary of past fertility experience of

the population, is useful to study the pattern of fertility change. Obviously, it does not indicate completed fertility, as the majority of the women are still in a potentially reproductive age group. For the purposes of this analysis, mean parity data have been presented by age group of women and comparisons are made by using rates standardised for age.

The current fertility measure in this analysis is the average fertility rate per woman in each age group, derived on the basis of indirect methods consistent with the children ever-born data. For the present purposes, two main methods are used to estimate current fertility. One method, known as the hypothetical cohort increment method of fertility estimation, gives an estimate of average age-specific fertility rates for the five-year period, based on the age-specific mean number of children ever-born per woman derived from the 1981 and 1986 Censuses. This estimate will give the levels of fertility in the 1981-86 intercensal period and can be used to assess the differentials in fertility between Aborigines and Islanders. In his fertility analysis for the Aboriginal population, Gray (1983, 1990b) used the hypothetical cohort increment method of fertility estimation and found it to be an appropriate method for analysis of Aboriginal fertility. This method of fertility estimation is based on two basic assumptions: first, it assumes that 'the average parity recorded for the cohort at the time of the first [census] was the same as the actual average parity at that time of the women covered by the second [census]' (Zlotnik and Hill 1981). This means that the mean parity of the women who died during the intercensal period should not be very different from that of the survivors. Similarly, if there is a sizeable migration during the intercensal period the migrant also should have a similar average parity as the others. If these conditions are not met the method can give a misleading results. Second, the method assumes that the pattern of age reporting is the same as the two census enumerations.

Another technique, which is known as the Arriaga and Arretx method (Arriaga 1983), is also used to obtain an alternative estimate of fertility. Fertility estimates are derived by using MORTPAK, the United Nations software package for mortality measurement. The two underlying assumptions of the hypothetical cohort method equally apply to this method. This method, when applied to mean parity data by age group (5-year) of woman for two points of time, will generate two age-specific fertility rates based on the fertility experience of women under the age of 35. Above this age, this method assumes that mean parity data are likely to be affected by poor reporting. This method of fertility estimation, according to the authors, takes into account the changing fertility of the population. This alternative estimate of fertility permits the assessment of fertility trends among the Aboriginal and Islander populations.



### **Aboriginal and Islander fertility: an overview**

There are no reliable estimates of the fertility of Aboriginal and Islander people prior to the mid 1960s. It was assumed that the population was in a near-stationary state with very high fertility and mortality levels (Smith and Gray 1985). In the absence of vital statistics for the Aboriginal (including Islander) population, Jones (1963) attempted to estimate Aboriginal fertility at the Bathurst Island mission (now Nguiu) in the Northern Territory, from the registers of wards. These data were supplemented by the registered births data from the Darwin Registrar-General's office. Estimated Total Fertility Rate of the Bathurst Island women was 4.6 for the 1952-56 period and 5.8 in the 1957-61 period. He later revised his estimates using 1966 Census data and found that the Northern Territory Aboriginal Total Fertility Rate was 6.4 for 1967 and 6.7 for 1968 (Jones 1972).

The Aboriginal and Islander populations have experienced a decline since European settlement. The census counts in the early periods, although very far from complete, indicate an increase in population after the Second World War. This recovery was achieved through a rise in fertility rather than a decline in mortality. The exact timing of the fertility increase and fertility changes of the Aboriginal and Islander populations cannot be determined with certainty, as there are no records of Aboriginal and Islander births. In addition, census data on Aboriginal people and Islanders showed signs of declining fertility, as the child-woman ratio (number of children under the age of five per woman in the reproductive age) experienced a long-term decline (Gray 1983).

The declining trend was particularly evident when the 1971 and 1976 Census data became available. They consistently showed a gradual shrinking of the base of the age-pyramid. These declining trends in Aboriginal and Islander fertility have been the subject of an in-depth study by Gray (1983, 1990b) who used the children ever-born data reported in censuses between 1966 and 1986. After adjusting the data to resolve data problems, particularly in the Aboriginal population counts, Gray (1983, 1990b) showed that fertility among the Aboriginal population began to decline somewhere in the 1960s and continued through the 1980s. According to Gray, the Aboriginal Total Fertility Rate for 1966-71 was as high as 5.9, declining to 4.1 in the 1971-76 period. Since 1976, the declining trend continued and the Total Fertility Rate for 1976-81 was 3.3, and reached 3.1 in the following intercensal period 1981-86, the lowest level ever recorded for the Aboriginal population in Australia. Supplementing census data on fertility by a series of case studies, Gray (1983) found sharp differentials in fertility between socioeconomic groups. He observed the association between age of leaving school and Aboriginal fertility to be positive; Aboriginal women who



were employed were experiencing lower fertility than the unemployed or those not in the labour force. These differentials, according to Gray (1990b), were particularly great in major urban areas.

Later, using 1986 Census data, Jain (1989) derived fertility estimates for the Aboriginal (including Islander) population for the 15-year period before the 1986 Census. Jain's fertility estimates were derived from 1986 Census data using the own-children method<sup>2</sup> developed by Cho, Retherford and Choe (1986). This method requires life table survival ratios applicable to the population and accurate identification of children in the family or household with their own mothers. The advantage of this method of fertility estimation is that using information provided in one census can give fertility estimates for the recent past to determine fertility trends.

The Total Fertility Rates derived by Jain were similar to those of Gray. However, fertility estimates derived using the own-children method were found to depress recent fertility estimates, and this may have been caused by poor data quality (Gray 1990b); the data used for the application of the own-children method encountered the problem of matching a large proportion of children (about 30 per cent) in the families with their mothers (Jain 1989). Jain also gave the age distribution of these children, and Gray finds that the age structure of the matched children was somewhat biased, as it was not possible to match many very young children in the families with their own mothers. This, according to Gray (1990b), is the reason for the depressed age-specific fertility produced by the own-children method for the recent period.

Fertility data available so far, with the exception of the work on Torres Strait Islanders by Caldwell, Duncan and Tait (1975), are not analysed separately for Aborigines and Islanders. The study by Caldwell, Duncan and Tait (1975) attempted to estimate Islander fertility by tracing birth records at the Queensland birth registry office relating to Thursday Islanders. In the absence of an Aboriginal and Torres Strait Islander identifier on the birth registration forms (which is still the case in Queensland) they identified Islander births from the surnames of parents. While acknowledging the limitations of this approach, the authors concluded that the Total Fertility Rate of Torres Strait Islanders would have been between 5.5 and 6.0 (Caldwell, Duncan and Tait 1975). This estimate is probably high for the Islanders as a whole, because the majority are now living in urban areas, in different States on the mainland. In urban areas Aboriginal fertility is found to be relatively low (Gray 1983, 1990b), mainly as a result of the greater access to education, health services, and formal employment than in remote regions such as the Torres Strait.

## Estimates of fertility

### *Retrospective (or life-time) fertility*

The mean number of children ever-born by a woman (mean parity) in each age group, estimated from the 1981 and 1986 Censuses for the Aborigines and Islanders, are presented in Table 2. For the purpose of comparison, mean parity estimated for the total Australian population is also shown in the table. Several observations can be made from the data. First, Aboriginal women have relatively higher fertility than that of Islanders. For instance, in 1981, the average parity of an Aboriginal woman was 2.3 compared to 1.8 for an Islander woman. In 1986, differentials have narrowed: 2.1 for an Aboriginal woman and 1.7 for an Islander woman. Both groups had higher fertility than the total Australian population. The true differences in the overall mean parity per woman between Aborigines and Islanders are much higher than the observed

**Table 2. Mean number of children ever-born (parity) to Aboriginal and Torres Strait Islander women aged 15-49 by age of woman, 1981 and 1986.**

Age group	Aborigines		Islanders		Australians	
	1981	1986	1981	1986	1981	1986
15-19	0.26	0.27	0.14	0.13	0.04	0.04
20-24	1.34	1.17	0.92	0.80	0.39	0.21
25-29	2.40	2.15	1.70	1.80	1.18	1.05
30-34	3.32	2.90	2.53	2.58	1.88	1.78
35-39	4.10	3.59	3.01	2.91	2.27	2.16
40-44	4.45	4.29	3.22	3.25	2.60	2.38
45-49	4.80	4.63	3.49	3.32	2.78	2.64
15-49 (observed)	2.28	2.07	1.75	1.72	1.42	1.39
(standardised) <sup>a</sup>	2.69	2.45	1.95	1.93	1.42	1.34

a. Standardised on 1981 age distribution of the total female Australian population.

means, if the variations in age structure between the two populations are taken into account.<sup>3</sup> The observed differences in mean parity between Aborigines and Islanders are largely masked because of the variations in the age structure between the two populations. If the effects of variations in their age structures on the mean parity were removed, the 1981 and 1986 differences would increase from 23 per cent to 32 per cent and from 16 per cent to 21 per cent, respectively.

Second, both Aboriginal and Islander women have higher fertility levels than that of the total Australian population. Both these patterns, without exception, are evident in all age groups, both in 1981 and 1986. Third, the speed of reproduction is greater among the Aboriginal women in young age cohorts than the Islanders and the total Australian population. For instance, Aboriginal women 15-19 years of age in 1981 add, on average, 0.91 children when they move to the 20-24 age group in 1986. Aboriginal women in the age cohort of 20-24 in 1981 add, on average, 0.81 children when they moved into 25-29 age group in 1986. For Islanders, by contrast, the inter-cohort increases in mean parity are lower among the very young cohort (0.66 mean children among women aged 15-19 in 1981) but gradually rise among the next two age cohorts. The contribution of mean number of children among the young age cohorts of the total Australian population is lower than that of the two indigenous population groups.

Fourth, Aboriginal and Islander fertility has been falling, a pattern in conformity with past findings about the total Aboriginal and Islander population (see Gray 1990b). There are, however, two exceptions to this pattern among Islanders. Women in the 25-29 year age group show a slight increase in mean parity from 1.70 in 1981 to 1.80 in 1986, while women aged 30-34 show an insignificant increase. Mean parity data examined here refers to total population. If one treated these figures as coming from two samples and tested the statistical significance of the differences, then one would find that for the Aboriginal population the decline in mean parity between 1981 and 1986 is significant. Also, for each age group, differences in mean parity between Aboriginal women and Islanders are statistically significant. Neither the marginal declines observed in overall mean parity (1.75 in 1981 to 1.72 in 1986) nor the changes recorded in each age group among Islanders are statistically significant. These observations suggest that Islander fertility did not fall at the same rate as Aboriginal fertility during the intercensal period 1981-86.

#### *Completed fertility*

As stated earlier, the data on mean parity among all women does not reflect completed fertility, as the majority of the women are still potential child-bearers. This measure reflects the past fertility experience of women currently aged 15-49 years. The mean parity of women aged 45-49 years can be considered as completed fertility, because women in this age group rarely contribute further to fertility. Among women in this age group the data often suffer from the problem of underreporting mainly because of the memory lapses. If the data are of reasonably good quality, the Aboriginal women in the 45-49 age group had 4.8 children on average in 1981, which declined to 4.6 in 1986 (Table 2). Islander women in the 45-49 age group, by contrast, had about 1.3 mean children ever-born, less



than the Aboriginal women of that age group. Both Aboriginal and Islander women had higher completed fertility when compared to the women aged 45-49 years in the total Australian population. The declining trend in completed fertility is clearly evident in all population groups. Aboriginal women showed a decline in the mean number of children by 0.17, Islander women by 0.16. For the Australian population as a whole, completed fertility declined by 0.13 children during the same period.

### *Current fertility*

Age-specific fertility rates consistent with mean parity, derived using the Arriaga method with Arretx interpolation procedures applied to the 1981 and 1986 data for the Aboriginal, Islander and total Australian population, are presented in Table 3. Average fertility in the intercensal period 1981-86 is also presented in the table using the cohort increment method of fertility estimation referred to earlier. The Total Fertility Rate for Aboriginal women aged 15-49 years for the 1981-86 period is estimated at 3.13, which is close to the estimates available for the combined Aboriginal and Islander population, of 3.1 (Gray 1990b). The other estimates available range from 2.84 (Khalidi 1989) to 3.0 (Jain 1989). Although the Total Fertility Rate is consistent with that of Gray, the age pattern of fertility is slightly different, because of the differences in methodologies used for the correction of the zero error and in estimating total number of children ever-born.<sup>4</sup> For comparative purposes, the fertility of the Australian population has also been estimated after correcting for the zero error on the same basis as for the other two population groups. Overall, Total Fertility Rates estimated are not very different from fertility trends observed among the total Australian population in the 1981-86 period (ABS 1989b).

While the Total Fertility Rate of Aboriginal women fell only slightly (2 per cent from 3.02 in 1981 to 2.96 in 1986) the Total Fertility Rate of Islanders did not show a corresponding decline. In fact, it increased slightly. It appears that the Arriaga-Arretx method produced a Total Fertility Rate heavily influenced by the slight increases in mean parity recorded for Islander women in the 25-34 age group. Among Aboriginal people, fertility among women below age 35 declined with a significantly higher (35 per cent) fall among women in 30-34 age group. Women above this age group showed an increase in fertility. Islander women above the age of 35 also showed an increase in fertility, but the increases recorded among women aged 20-29 years are substantial.

Although the Aboriginal Total Fertility Rate is slightly lower than that of Islanders, Aboriginal women begin child-bearing significantly earlier than Islanders. The peak fertility among Aboriginal women is in the 20-24 age group. Despite substantial declines in fertility among young women aged



**Table 3. Age-specific fertility rates for Aborigines, Torres Strait Islanders and all Australians by age of woman, 1981-86.**

Age group	Number of births per woman		
	1981-86	1981-82	1985-86
<b>Aborigines</b>			
15-19	0.133	0.146	0.136
20-24	0.192	0.199	0.171
25-29	0.130	0.138	0.125
30-34	0.073	0.089	0.057
35-39	0.041	0.021	0.044
40-44	0.036	0.008	0.043
45-49	0.022	0.003	0.016
Total Fertility Rate	3.13	3.02	2.96
<b>Torres Strait Islanders</b>			
15-19	0.077	0.089	0.077
20-24	0.167	0.152	0.161
25-29	0.187	0.181	0.208
30-34	0.136	0.153	0.120
35-39	0.047	0.033	0.036
40-44	0.038	0.016	0.035
45-49	0.009	0.006	0.013
Total Fertility Rate	3.30	3.15	3.25
<b>All Australians</b>			
15-19	0.014	0.027	0.018
20-24	0.077	0.095	0.079
25-29	0.148	0.137	0.146
30-34	0.097	0.087	0.086
35-39	0.031	0.041	0.033
40-44	0.012	0.025	0.014
45-49	0.007	0.009	0.005
Total Fertility Rate	1.91	2.06	1.88

less than 30 years, the peak fertility of Aboriginal women remained unchanged from 1981 to 1986. Islanders, by contrast, have a later peak at ages 25-29, which is similar to the total Australian population. Their fertility is, however, spread over a wide range of age groups.

Adolescent fertility is loosely defined by the International Planned Parenthood Federation (1984); as that among females in the 10-19 age group; this paper focuses on females in the 15-19 age group. The adolescent fertility rate is relatively high among Aborigines. In 1981, the share of adolescent fertility among Aborigines was about 24 per cent of total fertility. It remained virtually the same in 1986. Apart from the adverse health effects on mothers and children, relatively high adolescent fertility means women are less likely to possess good education and skills. This has an effect on participation in mainstream labour market programs because the greater the level of female education the more likely they are to be in the labour force and to be in formal employment (Daly 1991).

### **Conclusion and policy implications**

Retrospective fertility, expressed in terms of the mean parity of a woman, showed that Aboriginal fertility was significantly higher than that of Torres Strait Islanders. This pattern was found among women in virtually all age groups. In line with earlier findings of declining Aboriginal and Islander fertility, this study showed that fertility among Aboriginal women has been declining during the intercensal period of 1981 and 1986. In contrast, even though a decline in mean parity was recorded in some age groups, Islander fertility appears to have resisted a major decline during that period. It should be noted, however, that by 1981 Islanders had already reached substantially lower fertility levels. A decline from a low level is somewhat slower than a decline from a high level. The substantially lower retrospective fertility among Islanders indicates that their fertility began to decline earlier than that of Aborigines.

Contrary to the long-term fertility trends observed in the retrospective fertility measure, the current fertility derived from the reported children ever-born data showed that the Total Fertility Rates of Islanders were slightly higher than that of Aborigines. Among Aborigines, Total Fertility Rates declined marginally from 1981 to 1986. In the case of Islanders, the Total Fertility Rate not only resisted decline, but also showed signs of rising. Among the former group, the decline in Total Fertility Rate was arrested by an increase in fertility among the older cohorts of women, while among Islanders this was caused by increased fertility among the young cohorts, women aged 20-29 years.

Although Aboriginal fertility has been declining it is still at a high level, almost twice that of the total Australian population. The trends observed in fertility suggest that further declines in fertility among Aboriginal women are possible. To predict whether Islander fertility will remain at the current level or change in the future is difficult with the limited data available. Given the limited nature of the data and their quality, the patterns of fertility observed from the analysis of the two population groups should be considered as tentative. Although examination of socioeconomic differentials among Aborigines and Islanders is very important, it was precluded by the small number of Islanders in the data set. It is also important to assess fertility trends among ever-married women and never-married women, but this was not attempted here due to similar data problems. These variables are particularly important in the study of fertility behaviour among Aboriginal and Islander women, as a substantial proportion of births are to never-married women. For instance, Caldwell, Duncan, and Tait (1975) reported that the birth records they identified for Torres Strait Islanders show that more than half of the births were ex-nuptial. Also, as Gray (1983) has pointed out, a sizeable proportion of Aboriginal and Islander never-married women mistakenly reported their parity to the 1976 Census question which was directed to ever-married women.

This study used a different approach from previous studies in estimating total number of children ever-born by age of women and correction for zero-error. Yet, the Total Fertility Rate yielded was, encouragingly, in agreement with the previous studies, notably with that of Gray (1990b). However, the patterns and trends in fertility established by this analysis need to be confirmed by other studies and methods. Currently a national survey of social, demographic, health and economic characteristics of the Aboriginal and Islander populations is being planned by the ABS to be conducted in 1994 (Sims 1992). A substantial amount of money and resources have been allocated for this exercise, and this provides an invaluable opportunity to obtain detailed data on births. However, the results of this survey will not be available until 1995.

In the meantime, other methodologies need to be used to derive fertility estimates. One such method is the own-children technique which has been briefly described already. If the children in each of the families in households can be identified with their own mothers, then this technique can generate a reasonably accurate estimate of fertility for a period of about 15 years using one census enumeration. This will avoid the problem of differential population counts between censuses. However, as Gray (1990b) has cautioned, if the matching of mothers with their own children cannot be done with reasonable accuracy, then this method will have limited use. It appears that identification of individual family members in each of the households is carried out from the 1991 Census at the coding

and editing stage (ABS 1990). If this exercise proves satisfactory, it will certainly minimise the proportion of non-matched children. This will help the application of the own-children method to obtain fertility estimates of the Aboriginal and Islander populations.

The declining trend in fertility among the Aboriginal population has important effects on the age structure of the population. The fertility measures standardised for age clearly show that the age structure of the population is a crucial determinant of fertility variations between the two groups. Consistently falling fertility means progressively smaller cohorts of women entering the reproductive age group. This has been the pattern in the last three decades, or so, and gradually increasing mean ages of the Aboriginal and Islander populations have been projected in the medium-term (Tefaghiorghis and Gray 1991).

Thus, low fertility will radically alter the age structure of the population by reducing the share of very young and increasing the share of young adults in the short- and medium-term. This change will have important policy implications. Superficially, the low share of infants and children in the total population will ease the child-dependency burden on the working-age population. These changes in age structure also will have only long-term impacts on the labour force. If the present trends in fertility observed among Aborigines and Islanders continues, the fertility differentials between the two groups will disappear in the near future. The declining fertility will make it necessary to switch policy focus more towards the needs of the adult population in areas such as higher education, employment opportunities, income generation, and the provision of reasonable housing. Given the current situation in these spheres, meeting such challenges in the decades ahead will become a significant policy issue. If the present trend in fertility continues without interruption, it will produce a large old-aged component of the population in the long run.

## Notes

1. Gray (1983, 1990b) found that the El-Badry method of correction for the zero-error is less satisfactory for Aboriginal data and developed a methodology different to El-Badry's in his analysis of Aboriginal fertility and mortality data.
2. Essentially, this is a reverse survival procedure applied to estimate age-specific fertility for a period before the census (or survey) date. Estimates are reliable only up to a maximum of 15 years before the census/survey date, because adult children living in families are matched with their mothers using the information on age, sex, marital status and relationship to the head of the household (first person listed in the census/survey schedule). The children so matched (own-children) are classified by their own age and that of their mothers, and are then reverse-survived by using relevant life table survivorship values to estimate the number of births by age of mother. This will give the numerator of the fertility estimate. The denominator for the estimate by age will be obtained by reverse-surviving the mothers. Necessary



adjustments to the data for misreported ages, underenumeration and so on, can be made.

3. Aboriginal and Islander age-specific mean values were applied to the 1981 age structure of the total Australian women, and this procedure yielded slightly higher overall means for Aborigines and Islanders. This is because the total Australian female population in 1981 was favoured for high fertility, as the birth cohorts of the post-War baby boom had reached the peak ages of reproduction in 1981. But their observed fertility was low because of the effective use of contraceptives. Although the Aboriginal age structure has slightly changed in favour of females in the 15-35 age-group during the intercensal period 1981-86, it did not have a fertility-enhancing effect as with the total population. However, Islander age distribution tended to favour to a modestly higher fertility more than that of Aborigines. If the Islander mean parity values are standardised on the 1981 Aboriginal age structure, then the overall means for the Islanders will change from 1.75 to 1.64 and 1.74 to 1.62, respectively, for 1981 and 1986. On this basis, the expected Aboriginal mean number of children for 1986 will be 2.08.
4. Because the proportion of women who did not report their parity was very high (about 25 per cent among those aged 15-19 years) a further estimate of current fertility was made restricting the data to women who reported their parity. The hypothetical cohort method applied to the data gave a Total Fertility Rate of 3.03 for Aboriginal women and 3.58 for the Islanders for the 1981-1986 period. Arriaga-The Arretx method gave a Total Fertility Rate of 3.28 and 2.96 respectively, for Aboriginal women, for the periods 1981-82 and 1985-86. For Islander women these were 3.77 and 4.05, respectively, for the same period.

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